

NEEDLELESS SECONDARY ACCESS PORT FOR IV INFUSION SYSTEM

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TECHNICAL FIELD

The present invention relates generally to systems for administering fluids such as medicinal liquids to patients in hospitals, doctors offices, home settings, clinics and emergency field trauma situations, and, more particularly, relates to improvements in flow-through, quick disconnect and connect couplings used in association with tubings, syringes, vials, bags, and other such equipment commonly associated with medicinal liquid therapies.

BACKGROUND

In the administration of medicinal liquids using intravenous techniques, it is important and critical to avoid contamination of otherwise sterile devices and to avoid the spread of infections of various kinds through accidental needle sticks. Not only are the patients at risk throughout the administration of intravenous therapy, but also the care giver and other individuals within the health care environment are exposed to considerable risks if appropriate protective measures are not taken at all potential trouble spots within the procedure. Even activities as far removed from the immediate patient site as the disposal of discarded, used equipment can present significant danger, such as through the inadvertent puncture of the worker by blood-contaminated needles projecting through trash bags and the like.

As a consequence of these types of risks, there has been a trend in the health care industry toward the reduction and elimination of steel needles in connection with intravenous therapy. For example, instead of using a steel needle to penetrate a port of a catheter which has been installed at an appropriate access point on a patient's body, some currently available products utilize a variety of plastic couplings and valves for the purpose of communicating the catheter with the syringe, tubing, or other medical appliance administered by the practitioner. While such devices are helpful in the sense they reduce the risks associated with needle sticks, unfortunately, in many instances, there is still a significant potential for contamination due to exposed critical surfaces.

Accordingly, one important object of the present invention is to provide a quick connect coupling system or assembly which is particularly, although not exclusively, usable in connection with needleless medicinal liquid delivery systems and which lowers the risks of contamination associated with current IV therapies, including those which contemplate the use of steel needles or unprotected plastic cannulas for accessing the system. In this respect, it is an important object of the invention to provide male and female components of the assembly which are quickly and easily connectable and disconnectable from one another while the projecting, blunt cannula of the male component which establishes liquid flow communication with the female component is shielded from exposure to environmental elements before, during, and after interconnection with the female component, thereby helping to avoid any contact with contaminated surfaces and objects.

Another important object of the present invention is to provide a quick connect and disconnect coupling system

which is readily adaptable for use on a wide variety of system components, such as, for example, syringes, check valves, flexible tubings and flow lines, vials of both the single dosage and multi-dosage type, injection ports, access sites associated with a variety of components, and liquid supply bags and other containers for medicinal fluids. When the invention is used in connection with syringes, for example, it is contemplated that the male component with its recessed blunt cannula will be disposed on and form an integral part of the syringe body, while the female component with its receiving socket for the recessed cannula is disposed on the injection port, back flow check valve, or other major part of the system. Instead of using a puncturable membrane on drug vials and injection ports of flexible tubings, the present invention contemplates that such equipment will be provided with the female component and back flow check valve of the present invention so that the syringe or other appliance having the male component of the assembly integrated therewith is readily usable with the modified vial or injection port.

In carrying out the principles of the present invention, it is contemplated that the recessed, blunt cannula of the male component is protectively surrounded by an annular collar having an axially endmost extremity that projects outwardly beyond the open end of the cannula. In this manner, once a protective sheath or wrapper has been removed from the syringe or other appliance to be utilized by the practitioner, the protective collar becomes that portion of the appliance which is exposed to environmental surfaces and human contact. Consequently, the critical open end of the cannula itself remains in a sheltered and guarded position throughout the manipulation which is always necessary to access the system for administering the medicinal therapy.

In its preferred form, the cannula of the male component is sufficiently rigid as to serve as a means for depressing the valve stem of a normally closed valve which may be incorporated into the female component of the assembly whereby to open the valve. The valve stem may be a solid stem which, when depressed, allows fluid flow around its external surfaces due to a change in position of such surfaces relative to the internal portions of the valve chamber. On the other hand, the stem may be tubular such that liquid flow is directly through the cannula and into the tubular open end of the valve stem when the components of the coupling assembly have been connected together. Preferably, such coupling is accomplished by intermeshing threads on the two components. Furthermore, it is preferred that the male cannula have a luer taper in which the diameter of the cannula becomes progressively reduced as the open blunt end thereof is approached, thereby adapting the cannula to be press-fit into matingly luer-tapered female sockets associated with other components than those having a depressible valve stem.

The male component of the present invention may be attached directly to current design female-ended catheters, ports, and cannulas not provided with integral back-flow check valve systems.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective illustration of a system suitable for the intermittent administration of a medicinal liquid to a human or veterinary patient utilizing a syringe, straight injection port and catheter provided with a quick-attach, needleless coupling in accordance with the principles of the present invention;

FIG. 2 is a perspective illustration of couplings of the present invention in use not only with a hypodermic syringe,